Amendments to the Claims

This listing of claims replaces all prior versions and listings of claims in the application:

Claims 1-11 (Cancelled)

12.   (New) A system for determining a formation profile surrounding a well bore, the system comprising:

a computer operable to:

(a) receive field log data for a formation surrounding a well bore;

(b) generate a Jacobian matrix responsive to the field log data;

(c) solve for a new formation conductivity profile using the Jacobian matrix;

(d) calculate a new log response using the new formation conductivity profile;

(e) determine if the log response converges with the received field log data;

(f) perform a quasi-Newton update of the Jacobian matrix and repeating operations (c)-(e) if the log response does not converge with the received field log data; and

(g) output the formation profile based upon the log response if the log response converges with the received field log data.

13.   (New) The system of claim 12, wherein generating a Jacobian matrix comprises:

determining an initial vector from the field log data, said initial vector being at least one of a conductivity or resistivity vector; and

generating the Jacobian matrix using a sliding window and the initial vector.

14.   (New) The system of claim 13, wherein generating the Jacobian matrix using a sliding window comprises:

determining a single column vector of the Jacobian matrix based on a three-bed formation; and

sliding the single column vector across the formation to populate the Jacobian matrix.

15.   (New) The system of claim 12, wherein the computer is further operable to apply a maximum flatness inversion algorithm to the received field log data.

16. (New) The system of claim 12, wherein determining if the log response converges with the received field log data comprises comparing the determined log response to the received field log data to determine any differences therebetween.

17. (New) The system of claim 12, wherein performing a quasi-Newton update of the Jacobian matrix comprises performing a quasi-Newton update responsive to the determined log response and a presently existing Jacobian matrix.

18. (New) An article of manufacture comprising a machine-readable medium storing instructions operable to cause one or more machines to perform operations comprising:

(a) receiving field log data for a formation surrounding a well bore;

(b) generating a Jacobian matrix responsive to the field log data;

(c) solving for a new formation conductivity profile using the Jacobian matrix;

(d) calculating a new log response using the new formation conductivity profile;

(e) determining if the log response converges with the received field log data;

(f) performing a quasi-Newton update of the Jacobian matrix and repeating operations (c)-(e) if the log response does not converge with the received field log data; and

(g) outputting the formation profile based upon the log response if the log response converges with the received field log data.

19. (New) The article of claim 18, wherein generating a Jacobian matrix comprises:

determining an initial vector from the field log data, said initial vector being at least one of a conductivity or resistivity vector; and

generating the Jacobian matrix using a sliding window and the initial vector.

20. (New) The article of claim 19, wherein generating the Jacobian matrix using a sliding window comprises:

determining a single column vector of the Jacobian matrix based on a three-bed formation; and

sliding the single column vector across the formation to populate the Jacobian matrix.

21. (New) The article of claim 18, wherein the instructions are further operable to cause one or more machines to perform operations comprising applying a maximum flatness inversion algorithm to the received field log data.

22.   (New) The article of claim 18, wherein determining if the log response converges with the received field log data comprises comparing the determined log response to the received field log data to determine any differences therebetween.

23.   (New) The article of claim 18, wherein performing a quasi-Newton update of the Jacobian matrix comprises performing a quasi-Newton update responsive to the determined log response and a presently existing Jacobian matrix.

24. (New) A method for determining a formation profile surrounding a well bore, the method comprising:

(a) receiving field log data for a formation surrounding a well bore;

(b) determining a uniform initial conductivity vector based on the average of the logging data apparent conductivity; and

(c) generating a Jacobian matrix using a sliding window and the conductivity vector.

25. (New) The method of claim 24, wherein:

determining a uniform initial conductivity vector based on the average of the logging data apparent conductivity comprises determining a single column vector of the Jacobian matrix based on a three-bed formation; and

generating a Jacobian matrix using a sliding window comprises sliding the single column vector across the formation to populate the Jacobian matrix.

26. (New) The method of claim 24, wherein determining a uniform initial conductivity vector based on the average of the logging data apparent conductivity comprises applying a maximum flatness inversion algorithm to the received field log data.

27. (New) The method of claim 24, further comprising:

solving for a new formation conductivity profile using the Jacobian matrix;

calculating a new log response using the new formation conductivity profile;

determining if the log response converges with the received field log data;

performing a quasi-Newton update of the Jacobian matrix and repeating the solving, calculating, and determining operations if the log response does not converge with the received field log data; and

outputting the formation profile based upon the log response if the log response converges with the received field log data.

28. (New) The method of claim 27, wherein determining if the log response converges with the received field log data comprises comparing the determined log response to the received field log data to determine any differences therebetween.

29. (New) The method of claim 27, wherein performing a quasi-Newton update of the Jacobian matrix comprises performing a quasi-Newton update responsive to the determined log response and a presently existing Jacobian matrix.

30. (New) A system for determining a formation profile surrounding a well bore, the system comprising:

a computer operable to:

(a) receive field log data for a formation surrounding a well bore;

(b) determine a uniform initial conductivity vector based on the average of the logging data apparent conductivity; and

(c) generate a Jacobian matrix using a sliding window and the conductivity vector.

31. (New) The system of claim 30, wherein:

determining a uniform initial conductivity vector based on the average of the logging data apparent conductivity comprises determining a single column vector of the Jacobian matrix based on a three-bed formation; and

generating a Jacobian matrix using a sliding window comprises sliding the single column vector across the formation to populate the Jacobian matrix.

32. (New) The system of claim 30, wherein determining a uniform initial conductivity vector based on the average of the logging data apparent conductivity comprises applying a maximum flatness inversion algorithm to the received field log data.

33. (New) The system of claim 30, wherein the computer is further operable to:

solve for a new formation conductivity profile using the Jacobian matrix;

calculate a new log response using the new formation conductivity profile;

determine if the log response converges with the received field log data;

perform a quasi-Newton update of the Jacobian matrix and repeating the solving, calculating, and determining operations if the log response does not converge with the received field log data; and

output the formation profile based upon the log response if the log response converges with the received field log data.

34.   (New) The system of claim 33, wherein determining if the log response converges with the received field log data comprises comparing the determined log response to the received field log data to determine any differences therebetween.

35.   (New) The system of claim 33, wherein performing a quasi-Newton update of the Jacobian matrix comprises performing a quasi-Newton update responsive to the determined log response and a presently existing Jacobian matrix.

36.   (New) An article of manufacture comprising a machine-readable medium storing instructions operable to cause one or more machines to perform operations comprising:

(a) receiving field log data for a formation surrounding a well bore;

(b) determining a uniform initial conductivity vector based on the average of the logging data apparent conductivity; and

(c) generating a Jacobian matrix using a sliding window and the conductivity vector.

37.   (New) The article of claim 36, wherein:

determining a uniform initial conductivity vector based on the average of the logging data apparent conductivity comprises determining a single column vector of the Jacobian matrix based on a three-bed formation; and

generating a Jacobian matrix using a sliding window comprises sliding the single column vector across the formation to populate the Jacobian matrix.

38.   (New) The article of claim 36, wherein determining a uniform initial conductivity vector based on the average of the logging data apparent conductivity comprises applying a maximum flatness inversion algorithm to the received field log data.

39.   (New) The article of claim 36, wherein the instructions are further operable to cause one or more machines to perform operations comprising:

solving for a new formation conductivity profile using the Jacobian matrix;

calculating a new log response using the new formation conductivity profile;

determining if the log response converges with the received field log data;

performing a quasi-Newton update of the Jacobian matrix and repeating the solving, calculating, and determining operations if the log response does not converge with the received field log data; and

outputting the formation profile based upon the log response if the log response converges with the received field log data.

40.   (New) The article of claim 39, wherein determining if the log response converges with the received field log data comprises comparing the determined log response to the received field log data to determine any differences therebetween.

41.   (New) The article of claim 39, wherein performing a quasi-Newton update of the Jacobian matrix comprises performing a quasi-Newton update responsive to the determined log response and a presently existing Jacobian matrix.